Record hot to record cold in a July of extremes

Description

While this year's July may not have broken any monthly records – it was book-ended with some localised daily records at both extremes of the temperature spectrum.

The month started with the highest recorded July temperature in our UK climate records with 36.7C recorded at Heathrow on 1 July.

Then on the last day of the month, we saw the opposite extreme – with a number of stations across the UK breaking their lowest recorded July temperature.

Some of these stations have fairly long records – below we've highlighted those stations which broke their July low record which have observations going back for 30 years or more.

STATION	COUNTY	PREVIOUS RECORD	PREVIOUS RECORD DATE	YEARS OF DATA	TEMP 31/07/15
ALICE HOLT LODGE	Surrey	3.9	03/07/1984	64	3.5
KEELE	Staffordshire	5.2	16/07/2001	63	5
EXETER AIRPORT	Devon	3.3	01/07/2011	50	2
CHIVENOR	Devon	5.7	07/07/1996	38	5.6
PERSHORE	Worcestershire	3	04/07/1965	36	2.7

These temperatures came about after several days of a northerly airflow which brought colder than average air over the UK. Clear skies allowed temperatures to drop rapidly overnight across many spots, leading to some of the localised records.

None of these new station records came close to breaking the all-time UK record for July of -2.5C which was set at both St Harmon (Powys) on 9 July 1986 and Lagganlia (Inverness-shire) on 15 July 1977. It's worth noting here that lowest daily temperature records exclude stations above 500 metres above mean sea-level.

Other extremes for July 2015 are:

- The wettest day was recorded at Cambridge Botanic Garden on the 16th, with 87.1mm of rain recorded in 24 hours. This is significantly more than the whole-month average for July at that station, which is 50.7mm.
- The strongest gust was recorded at the Needles on the Isle of Wight on the 26th, with 60mph.
- The Sunniest day was on Fair Isle, Shetland, on the 26th, with 16 hours of sunshine recorded.
- The coldest temperature recorded during the month was a chilly -0.6C at Katesbridge in Down, Northern Ireland on 15 July – although this wasn't a record for that station.
- The warmest temperature was 36.7C recorded at Heathrow on 1 July – you can read more about that on our blog.

Date Created
August 2015

Big waves and blustery winds for western coasts

Description

A low pressure system off to the west of the UK is generating some big waves which are set to affect western coasts through today and Tuesday.

Waves of between 2-4 metres (about 6-12ft) are expected through the peak of the swell early on Tuesday at exposed beaches in the South West.

There will also be some fairly strong winds tomorrow, with the potential for gale force gusts around coasts in western areas – which may make for difficult conditions for those camping.

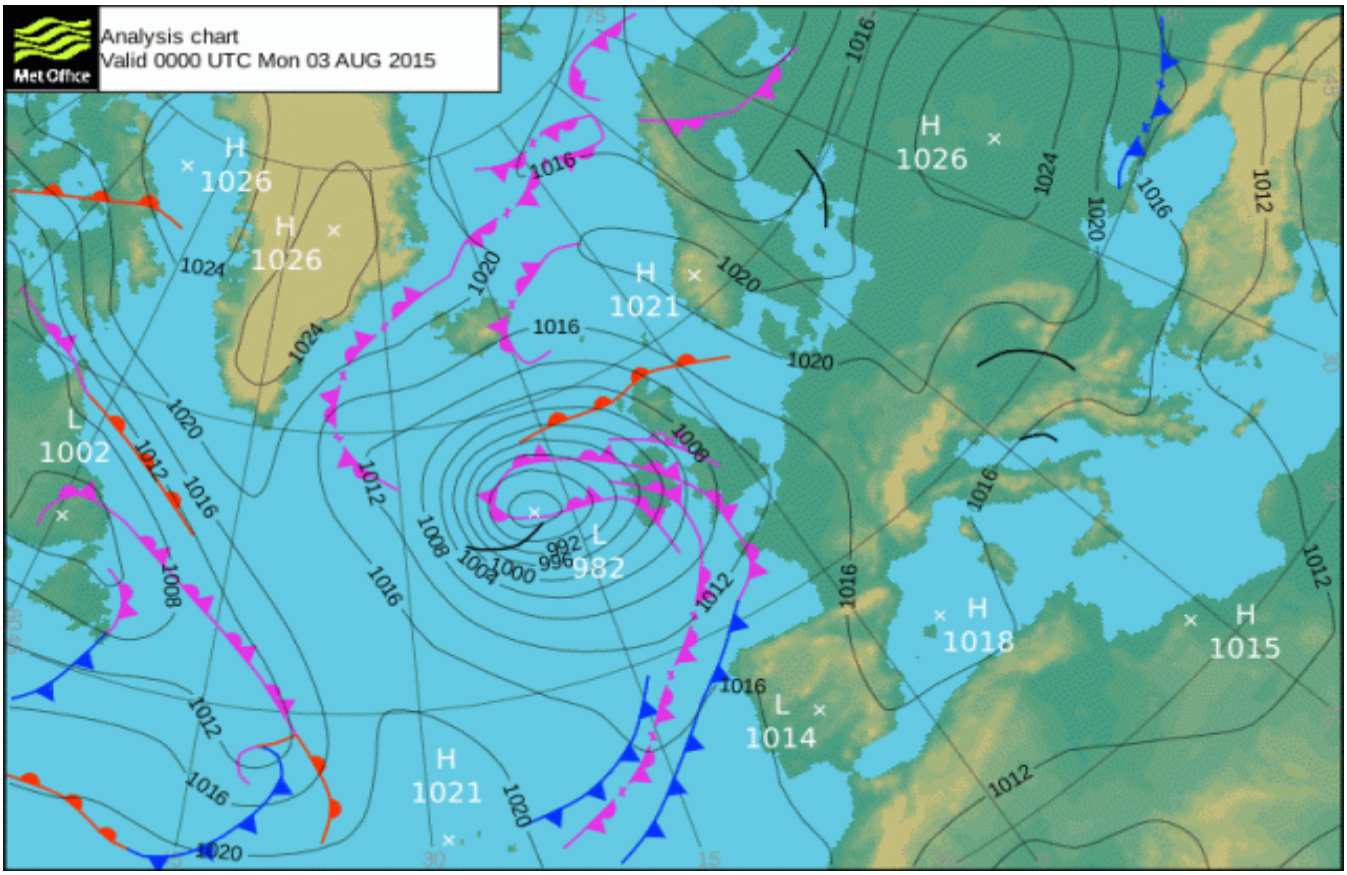
With many people around the coasts for summer holidays, people are being urged to take care.

A spokesman for the RNLI said: “Large waves could make some normal coastal activities we take for granted significantly more risky; the force of surging water or breaking waves can easily knock you over and quickly and drag you out of your depth and once in the water it can be difficult to get out.

“Those particularly at risk from these conditions are walkers on beaches or harbour walls when the water is high; spectators looking at the waves who get too close; and anglers fishing from rocks or exposed headlands. With a low pressure and high winds forecast, areas that you may have considered safe before could be underwater when large waves come ashore.

“If you are planning a coastal activity, our advice is to respect the water; watch the shore from a safe distance and assess the conditions – think about the risk before deciding if you need to go closer.”

The waves are the result of a low pressure which is currently to the west of Ireland. As it has been tracking across the Atlantic its strong winds have been generating large waves.



Pressure chart showing the location of the low pressure at 0100 HRS on Monday morning, where it is generating large waves which are heading for western coasts.

As the low gets closer to the UK it will track to the north of Scotland, but the waves it has generated will continue marching east towards our coasts.

The size of the waves on any given beach will depend on a number of local factors.

Tides are not particularly large at the moment, meaning the risk of coastal flooding is low for the next few days despite the big waves.

A spokesman for the Environment Agency said: “The flood risk is very low for the next few days. We always monitor the situation closely, working alongside partners, including the Met Office and local authorities, and issue alerts and warnings if required. People and businesses can sign up to receive these free flood warnings and to check their flood risk via our daily flood risk forecast and live Flood Warnings map.”

With British and Irish waters being dangerously unpredictable, the RNLI have just launched a new campaign ‘Respect the Water’ to raise awareness of hidden dangers around our coastline.

For more information on ‘Respect the Water’ visit http://rnli.org/safety/respect-the-water/Pages/what-is-respect-the-water.aspx

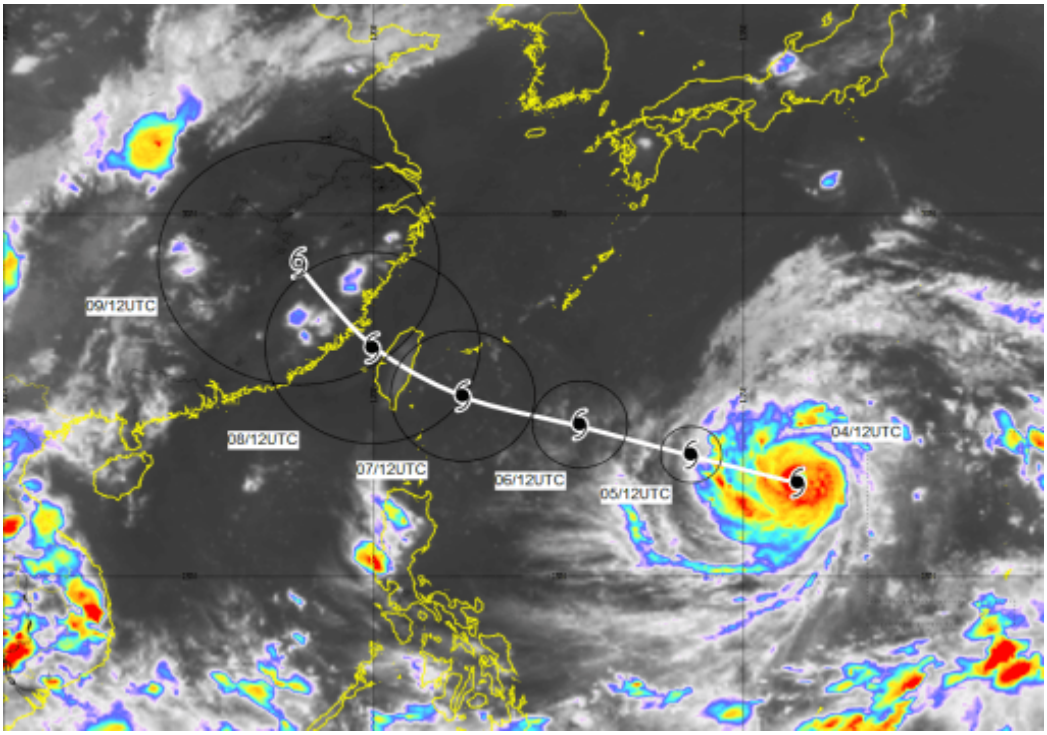
Date Created
August 2015

Taiwan preparing for violent Typhoon

Description

A Typhoon is expected to bring flooding to parts of Taiwan and eastern China later this week with 500-700mm of rain forecast. Typhoon Soudelor is at the moment moving through the northwestern Pacific Ocean and looks likely to track across central Taiwan on Friday before making landfall over eastern China as it weakens.

This is a violent typhoon and is presently 500 miles to the west of the Northern Mariana Islands in the northwestern Pacific Ocean and is moving towards Taiwan. Currently surface wind speeds are estimated to be 130 mph with gusts of 190 mph, although these speeds are likely to ease slightly before reaching Taiwan.



Picture courtesy of Japanese Meteorological Agency

This storm brings the threat of a storm surge and high waves to coastal areas of Taiwan and the southern Ryukyu Islands by Friday, as well as very strong winds quite widely, including to the capital of Taiwan, Taipei. Torrential rain is also expected which will bring a risk of significant flooding with the potential for 500-700mm rain falling in some areas in a 24 hour period.

The exact track of the storm could change over the coming days; you can see the latest track of Typhoon Soudelor through Storm Tracker and by following @metofficestorms on Twitter.

Date Created
August 2015

Met Office in the Media – 7 August 2015

Description

An article published today makes a number of claims about Met Office weather and climate science.

It would be difficult to cover all the points raised in this blog, but here we look at the science and facts behind a few of the assertions.

The first decadal forecast issued in 2007

We did indeed publish the first groundbreaking decadal forecast in 2007. It had two headline statements:

1. that half of all years after 2009 would be warmer globally than the record year at that time (1998) – This is doing well so far with two out of five years (2010 and 2014) warmer than 1998 and given current temperature levels, it's likely this will be 3 out of 6 by the end of this year, consistent with our forecast for 2015
2. that 2014 would be 0.3 °C ± 0.21 °C warmer than 2004 (giving a range of 0.09 °C to 0.51 °C) – WMO figures show the global temperature for 2014 was 0.13 °C higher than that in 2004; which is within the range of the forecast

Adjustments to global temperature data

The article says we adjust our temperature figures 'without justifying why it is scientifically appropriate'. In fact, numerous peer-reviewed science papers from research centres across the world provide detailed explanations of how and why datasets are adjusted to ensure they are as accurate as possible. This is available for anyone to view and analyse.

The conclusion that the world has warmed is supported by independent analysis of global temperature data.

European heatwaves

We published a paper stating heatwaves like that seen across Europe in 2003 would become more frequent under climate change. Subsequent observations back up these conclusions; 2006 saw comparable heat in the UK, 2010 saw intense heat across eastern Europe, and there's been a prolonged heatwave across much of Europe this year (although not in the UK).

Weather extremes

Met Office research supports climate research centres around the world which concludes we expect more extremes of heat and rainfall as the world continues to warm. The article says this 'simply hasn't happened' but in fact, research shows there has been an increase in both. While here in the UK, we have also seen an increase in the number of temperature and rainfall records.

The article also states 'the Met Office did all it could to claim the rain that caused last year's exceptional flooding… was the worst ever recorded.' We've done studies (here and here) of the exceptional rainfall in winter 2013/14., which across southern England was one of the, if not the most, exceptional periods for winter rainfall in around 250 years. Here's a fuller research piece about the winter 2013/14 storms.

Greenland ice

The article says that we claimed Greenland ice would melt in future due to global warming. We did, and we were clear that it would take thousands of years to happen, not 'any time soon'. Observations show Greenland has been losing 300 gigatonnes (1 gigatonne is 1000,000,000 tonnes) of ice a year over the last 12 years and research shows surface temperatures have clearly risen.

Other claims

A series of other claims are made in the article, mostly focusing on our forecasts over seasonal to decadal timescales. The Met Office is at the forefront of this pioneering area of research and we are increasing skill in this area.

According to standards set by the World Meteorological Organization the Met Office is ranked as the most accurate global met service in the world. We will continue our research in collaboration with our global scientific partners to improve this vital area of science.

Date Created
August 2015

Win the chance to be a weather presenter for the day!

Description

Are you interested in why rain has fallen, where the sun is shining or how strong wind gusts are – and what this means? If so, the Met Office's WOW – Weather Observation Website – enables you to be part of the weather forecast from your own back garden.

The Weather Observation Website is the perfect way to stay occupied during the summer holidays, whether you're interested in being a meteorologist, presenter or scientist, or you just want to know

We're giving one lucky winner (aged 8-13) the opportunity to present the daily weather forecast from the Met Office's TV studio. The weather forecast is watched online by hundreds of thousands of people every day through the Met Office's home page, social media and websites such as Yahoo! and MSN.

As part of the experience, the winner will get the lowdown on how the weather works from one of our meteorologists – detailing how forecasts are created and how this is turned into the weather report seen on TV.

After some training the winner will receive a tour of the Met Office – including getting to see our supercomputer; one of the top ten most powerful computers in the world. Finally, their skills will be put to the test in the Met Office's media centre as they present the weather forecast for the following day.

Entrants need to go the Met Office WOW website to find the answer to this question:

What **example search** is on the WOW homepage? Is it:

1. Exeter, UK
2. Manchester, UK
3. Bristol, UK

Answers must be sent to MetOfficecompetition@3-monkeys.co.uk, and we will contact the winner by the 1 September 2015 to confirm their prize.

The competition goes live today (10 August) and closes on 28 August 2015. To find out more about the competition, visit the First News website.

Entrants must be between 8 and 13 years of age and the winner must be accompanied by a parent, family member or legal guardian over the age of 18 years old.

Good luck!

Met Office Terms and conditions

- You must be between the ages of 8-13 to enter the competition
- Met Office will provide travel expenses up to a value of £100
- Overnight accommodation will not be provided
- The winner presenting the actual Met Office daily weather broadcast is subject to the winning child being able to present the weather in a clear and competent fashion, although it is also intended to entertain. The winner will be trained on the day to do present the weather, but if the final presentation is deemed to be of a standard which cannot be aired, the winner will instead receive a copy of their presentation to take home and keep
- The Met Office will endeavour to accommodate the winner at a date suitable to the winner. However, they must be able to get to the Met Office's headquarters in Exeter on a weekday, for the hours of 10am-4pm before the end of November. The date must be mutually agreeable to the Met Office
- The winner must be accompanied by a parent, family member or legal guardian over the age of 18 years old
- The winner is able to bring a friend should they wish – however only the winning child will have the chance to present the daily weather broadcast

Date Created
August 2015

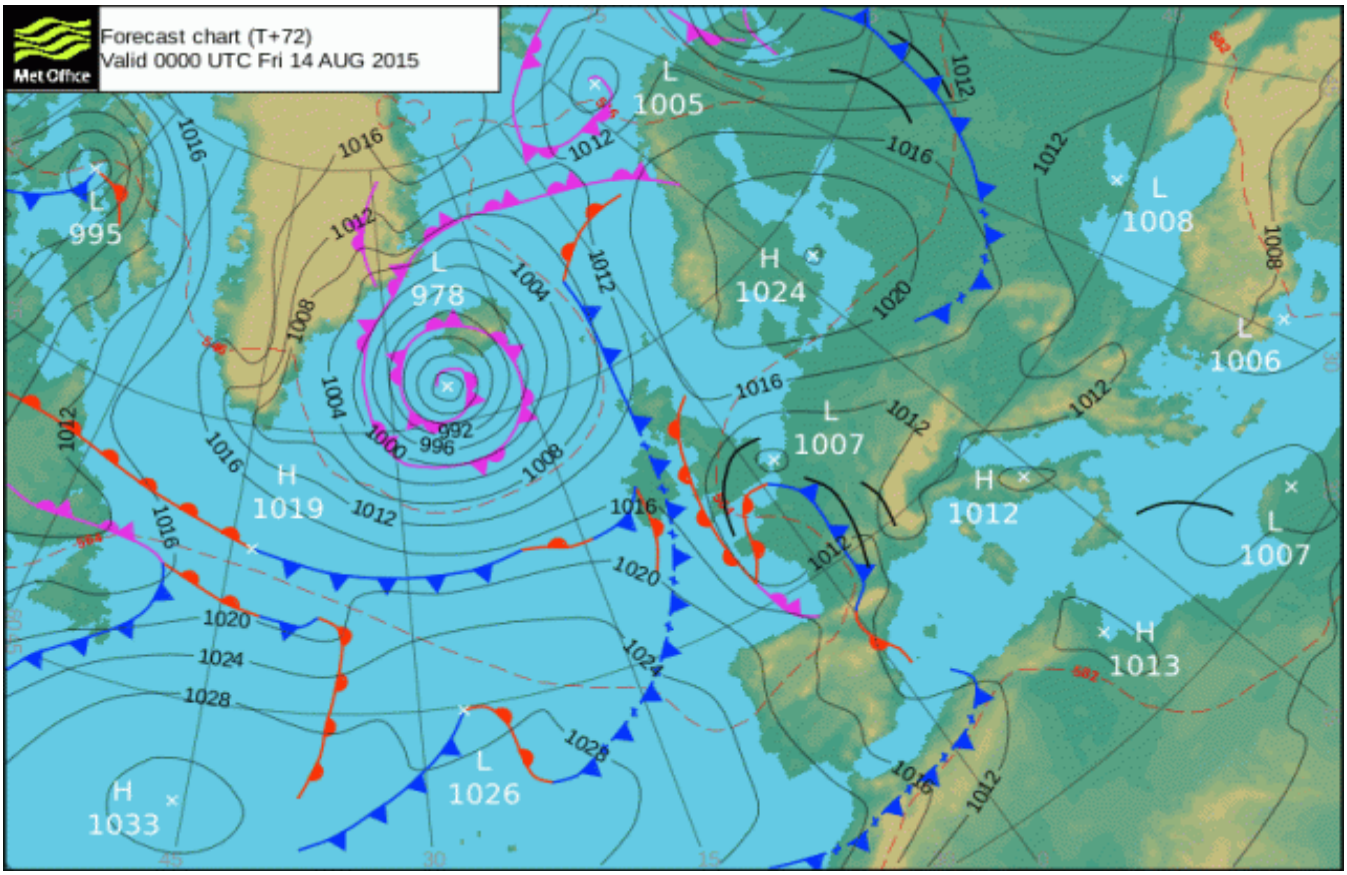
Summer downpours on the way

Description

The weather forecast for later this week is presenting a challenge for our meteorologists.

All the ingredients are present to produce significant rainfall on Thursday and Friday, but complex interactions in the atmosphere make it difficult to say with certainty where the rain will be most intense.

An area of low pressure is expected to develop and push north across the Bay of Biscay and western France on Wednesday night and into Thursday, arriving across southern England on Thursday morning. As it comes north, very warm air over the continent is expected to be drawn into the low pressure's circulation, making it feel very humid across central and southern areas of the UK



Forecast pressure chart valid for 1am on Friday showing the location of the low pressure system over the southeast of the UK.

Warmer air can carry more moisture, and as such some very heavy rain is possible. However, this type of situation is difficult to forecast accurately a few days ahead and there is some uncertainty about which areas will see the heaviest rainfall. Current indications are that central and southern Englandand Wales are most likely to be affected. We may also have hail and thunder, this is most likely earlyon Thursday and then again Friday afternoon.

As we have already seen this summer, this type of weather situation has the potential to cause sudden, localised surface water flooding and hazardous travelling conditions.

Met Office National Severe Weather Warnings have been issued and these will be updated over the next few days as confidence in where and when we will see the heaviest rainfall increases.

Looking further ahead, the whole system is expected to clear away to the east during Saturday, with drier, fresher weather following to all parts with some sunshine.

Date Created
August 2015

Rain or shine this weekend?

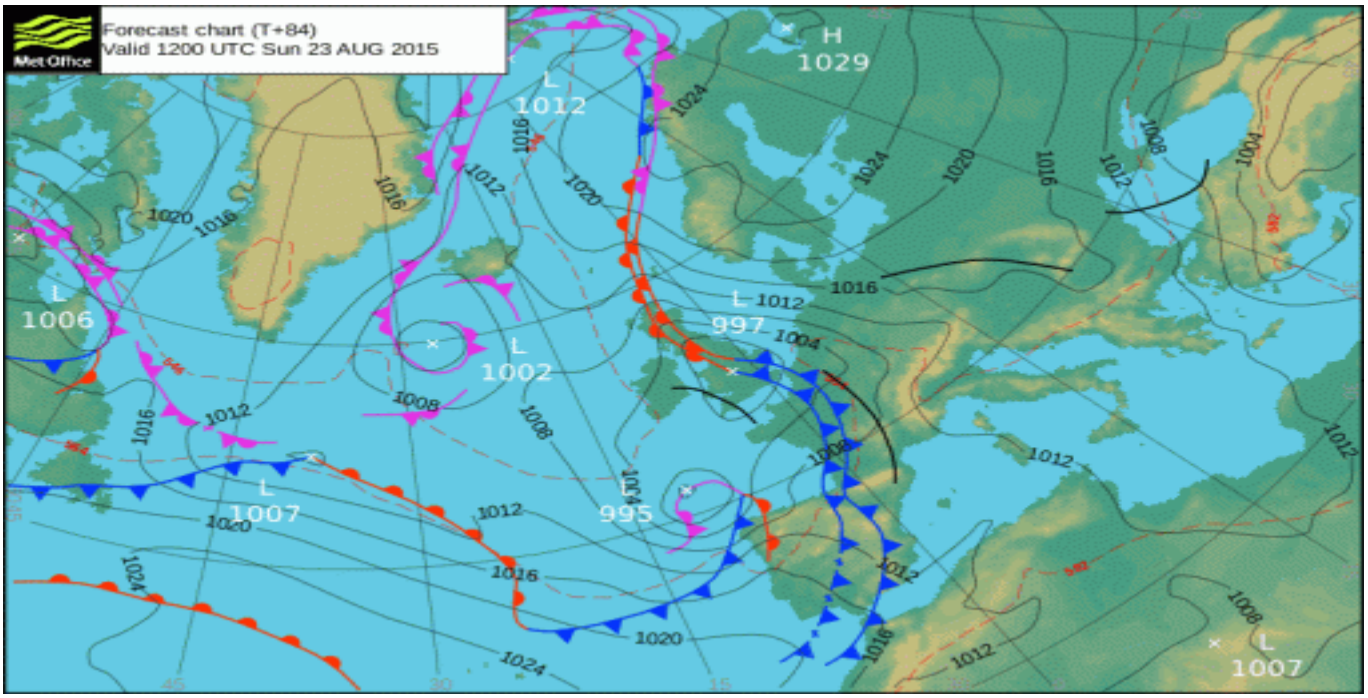
Description

You may have heard that this weekend could be cloudy and wet…or sunny and dry, that's because as with other weekends this summer there has been some uncertainty in the forecast.

After a mixed week of some sunshine, rain and showers it looks like we'll see more of the same over the weekend as a frontal system interacts with warm, humid air spreading northwards from the continent.

We are now fairly confident that on Saturday the UK will be split weather wise. There'll be bright and breezy weather in the north west with a few showers. Meanwhile the south east will be warm and humid, perhaps hot with temperatures in the high 20s which could set off a few isolated thunderstorms. In between we expect to see a band of cloud and rain which could be heavy and persistent at times.

Overnight and into Sunday the wet weather is expected to become more widespread across England and Wales and move into Scotland with some heavy rain at times.



At the moment, central and western parts of the UK seem most likely to see the heaviest, most persistent rainfall as the frontal system pivots. However, this pivot position could change over the coming days, and this is critical because it will determine whether we need to issue weather warnings.

Once we have more certainty where the most persistent, heavy rain will be we will review whether a Met Office National Severe Weather Warning is required. Therefore, as ever, it is best to check the latest forecast if you have plans for the weekend.

Tony Berry, Visitor Experience Director at the National Trust said: “Despite the unsettled weather this weekend, there’s still loads to do at National Trust places across the country. From windswept coastal paths and woodlands to hundreds of historic houses and gardens, there’s always something to explore come rain or shine. We’ve got a whole host of activities to wear the kids out too, with everything from pirate adventures and fossil hunts (just remember to pack the waterproofs and wellies) to storytelling and wild art. And throughout August we’ll be bringing the coast to a whole host of cities across the UK in the form of a giant shell – Shellsphere – where passers-by will have the opportunity to see, smell, hear and taste the sea.”

Next week, we’ll continue to see a combination of drier, sunny days with cloudier spells and some rain or showers at times but it will be warmer than recently.

Date Created
August 2015

Met Office in the news – BBC weather contract

Description

You may have seen reports in the media today that the Met Office won't be the BBCs main weather provider when the current contract ends.

Obviously everyone at the Met Office is disappointed that we won't be supplying weather presenters and graphics to the BBC in the future.

As a trusted British institution we work at the heart of Government, with a wide range of customers, and with emergency responders to maintain resilience and public safety. We will be working with the BBC and others to ensure the nations official weather warnings are broadcast in a consistent way; and that our advice underpins forecasts when it matters most. We are also supporting our popular team of presenters to ensure clarity on their future.

Steve Noyes, our Operations and Customer Services Director, said: "Nobody knows Britain's weather better and, during our long relationship with the BBC, we've revolutionised weather communication to make it an integral part of British daily life.

"This is disappointing news, but we will be working to make sure that vital Met Office advice continues to be a part of BBC output.

"Ranked No 1 in the world for forecast accuracy, people trust our forecasts and warnings. There are lots of ways to access these both now and in the future – via the Met Office app, website, and video forecasts, as well as through television and other digital news providers."

Much of our 93 years of working with the BBC has been based solely on radio and television forecasts. The world is changing though, and nowadays people access weather information in many ways.

As ever, everyone will be able to access trusted Met Office forecasts and warnings on our own digital channels like our app and mobile website, delivered as text, symbols and videos. You can embed that information easily in your own website too. We continue to provide our expert forecasts on independent

television networks and there are also now many other news organisations increasingly sharing Met Office content online.

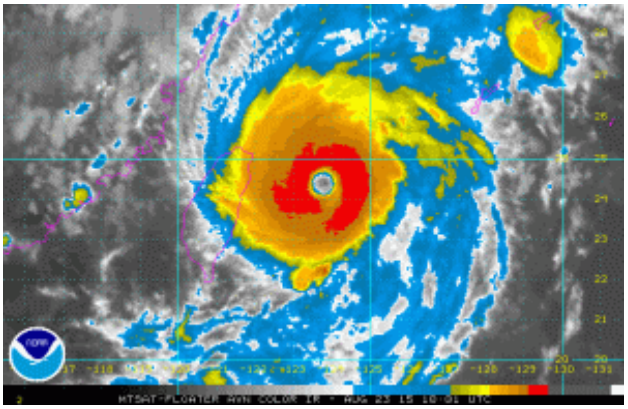
Date Created
August 2015

Typhoon heads for Japanese volcano

Description

Typhoon Goni, which was located just east of Taiwan on Sunday morning, is expected to track across the western side of Kyushu Island in SW Japan through Monday. There is a risk it could bring up to 200mm of rainfall in 24 hours across Kyushu, leading to a risk of flooding and landslides along with the threat of Hurricane Force winds and a storm surge. This comes as the Japanese Meteorological Agency issues a level 4 alert for a major volcanic eruption on Mount Sakurajima.

Mount Sakurajima is one of 16 'Decade Volcano' around the globe, meaning that it is a potentially destructive volcano close to populated areas. The level of alert suggests that the local population should prepare for evacuation, which would be made more difficult by a Typhoon impact.



Satellite image courtesy of National Oceanic and Atmospheric Administration

Typhoon Goni has already bought heavy rainfall and Typhoon strength winds across the NE tip of Luzon in the northern Philippines. Goni is expected to remain a Strong Typhoon (equivalent of a Category 2 Hurricane) with sustained winds of 80 knots and gusts to 115 knots, tracking steadily north through the rest of Sunday and Monday across the eastern East China Sea. There is a risk of a storm surge and coastal flooding up through Kagoshima Bay in southern Kyushu.

Once Goni passes across western Japan, it is likely to lose its tropical characteristics, but could still bring flooding rains to the Korean Peninsula on Tuesday.

Date Created
August 2015

Highest temperatures and rainfall over the weekend

Description

Over the past 24 hours the weather has delivered a mixture of hot sunshine, thunderstorms, hail and heavy rain as we highlighted earlier in the week.

As expected, sunny skies and warm air being pushed northwards from the continent allowed temperatures to climb across central and eastern parts of the UK, reaching maximums in the high 20s and low 30s on Saturday with a humid feel:

Table showing Maximum temperatures for Saturday 22 August 2015

Location	Maximum Temperature in C
Gravesend	30.9
Kew Gardens	30.9
Heathrow	30.7
St James's Park	30.7
Northolt	30.6

These high temperatures set off two areas of thunderstorms, one over central southern England and another over the Midlands, moving into northern England. These storms caused localised surface water flooding and flooding of some properties in North Yorkshire as up to 30mm of rain fell in an hour. There were also impacts to the York-Leeds rail line.

Across the northwest of the UK it was fresher and mainly dry with some sunshine, while the areas in between were rather cloudy with some rain.

Overnight, the heavy, thundery downpours continued to move northwards, while heavy rain also spread into western parts of the UK. By this morning at 10am the rainfall totals for the 24 hours were as follows:

Table showing rainfall totals for the 24 hours up until 10am on Sunday 23 August 2015

Location	Rainfall in mm
Bramham	62.6
Ryhill	54.6
Tredegar	40.6
Linton-on-Ouse	39.8
Scolton Country Park	36.8

During today, the heavy rain has continued to spread north and eastwards with a mixture of sunny spells and heavy showers following across the south. Ahead of this, temperatures across eastern

England have again peaked in the mid to high 20s.

Table showing rainfall totals bwtween 10am and 4pm on Sunday 23 August 2015

Location	Rainfall in mm
Hereford	20.8
Llanbrynmair	20.4
Sarn	17.8
Lake Vyrnwy	17.2
Porthmadog	17.2

The changeable weather will continue as we head into next week. Met Office National Severe Weather Warnings have been issued and everyone is encouraged to keep up to date with forecasts and warnings over the next few days and to make plans accordingly.

Date Created
August 2015

First hurricane for Florida since Wilma ten years ago

Description

Tropical Storm Erika was around 390 nautical miles east of Antigua on Wednesday morning and is moving west at around 18mph. The storm is expected to track close to Puerto Rico and the Lesser Antilles on Thursday and then towards the Bahamas or South Florida by the end of the weekend, by which time Erika will probably have developed into a Hurricane.

The official guidance from Miami is for Erika to gradually strengthen to a category 1 hurricane by the start of next week. Erika will be the second hurricane of the 2015 season. Hurricane Wilma, in October 2005, was the most intense hurricane recorded in the North Atlantic, with an estimated central pressure of 882 mb.

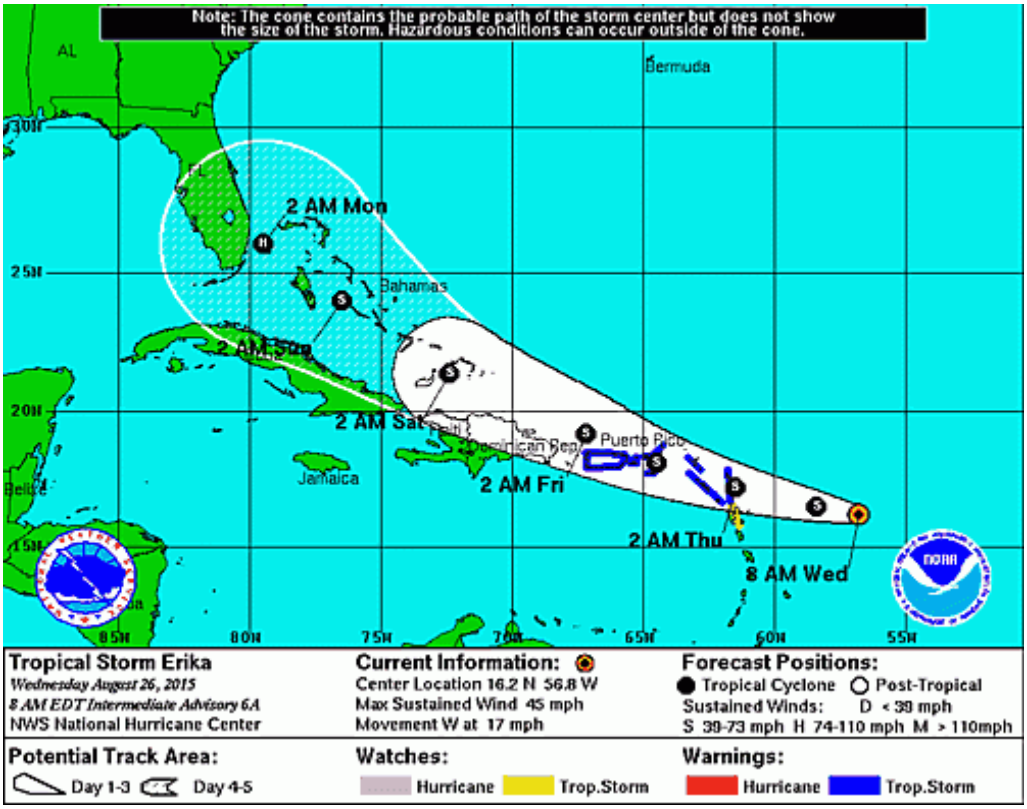


Image courtesy of National Oceanic and Atmospheric Administration

As well as potentially damaging winds, Erika is likely to produce very heavy rainfall and a modest storm surge.

When Erika passes over the Lesser Antilles on Thursday there is expected to be 120mm of rainfall in 24 hours, but as Erika deepens near to the Bahamas and South Florida, totals of up to 400mm in 24 hours could occur, although there is some uncertainty in the exact location and intensity of Erika at this stage.

It is 10 years since Hurricane Katrina made landfall in Florida. It was the most costly hurricane on record causing an estimated $108 billion in damage in Louisiana and Mississippi. It also caused an estimated 1500 deaths. The strongest winds were recorded during 25-30 August 2005 and were over the coastal areas of Louisiana and Florida.

No major (cat 3 or above) hurricane has made landfall on the USA since Wilma in October 2005. As for cat 1/2 hurricanes over the USA, Arthur just made landfall in 2014 (glancing blow to N Carolina) and in 2012 Isaac made landfall over New Orleans. Although technically not a hurricane, Sandy had hurricane force winds at landfall over New Jersey. Other US hurricane landfalls since 2005 have been Irene in 2011, Dolly, Gustav and Ike in 2008 and Humberto in 2007.

Date Created
August 2015

A look back at this week's news

Description

The Met Office has been in the news again this week, with our contracts for broadcast weather services generating a huge amount of column inches and public reaction.

It's certainly been heartening to see and hear the level of public support for us. Over the last few days, 'Met Office' trended on Twitter and approaching 34,000 people have read our blog. We've had over 27,000 mentions of the Met Office on Twitter and lots of comments on our Facebook page. Here's a very small selection of the feedback we've received:

- @metoffice weather app will remain my first choice when it comes to weather reports.
- @metoffice Met Office most highly respected in world. …
- Dont worry @metoffice, you'll always be my forecaster of choice ? #weather
- .@metoffice Been using your app for quite a while. You provide an amazing service.
- … Behind that lay my respect for the expertise and professionalism of the Met Office and its presenters.
- … I do trust The Met Office and will follow them online …
- … I've used the Met Office local weather map for years and find its forecasts almost unerringly accurate. You must also take into account the exceptional volatility of UK weather, and I doubt anyone can better MO for their knowledge and experience in that regard.

Moving from the positives to the negatives – there is some misinformation around.

Firstly about our apps. There's been some suggestion in the media that our app is not popular. However, our apps have had 12 million downloads and they are rated 4 out of 5 on android and 3 out of 5 on iPhone. Like all providers we are always looking to improve and we hope build on this in the future. Last week we had 128% increase in app downloads and a 94% increase on website hits too.

Secondly in terms of value for money, it has been suggested that the Met Office charges the BBC £30 million a year. This, in fact, is the total of our commercial revenue from a wide range of customers – aviation, energy, marine, retail to name but a few. We receive only a small fraction of that amount for our presenter services to the BBC. Given that our presenters are paid at market rates this has to be great value for money.

For us, though, it's never been about the money. It's about serving the nation and ensuring the public benefits from the best weather forecasts and warnings to make informed decisions.

Date Created
August 2015

So what happened to our summer?

Description

Our Chief Scientist Professor Dame Julia Slingo OBE FRS reflects on this summer's weather and what has influenced it:

No-one can deny that we have had a pretty disappointing summer with a lot of unsettled weather and only a few warm spells, especially through July and August. Our weather has been dominated by low pressure over and to the west of the country that has brought us periods of heavy rain from the south – what we call the Spanish Plume. So what has been happening?

If we look beyond our shores there have been some big changes in the global climate this year. El Niño is in full flight, disturbing weather patterns around the world. The low pressure that has dominated our weather is part of a pattern of waves in the jet stream around the world that has brought crippling heat waves to places like Poland and Japan. And, looking back over past El Niños, you could have expected that a more unsettled summer might be on the cards for the UK. Closer to home the North Atlantic is more than 2 degrees colder than normal. It seems quite likely that the unusually cold North Atlantic has strengthened and pushed our jet stream south, also contributing to the low pressure systems that have dominated our weather.

So could all this have been anticipated? Seasonal forecasts for this summer suggested that temperatures and rainfall would be near normal. However, as the season progressed all the leading models around the world failed to capture the signal for unsettled weather over the UK. We all know that forecasting months and seasons ahead is still in its infancy and much more research needs to be done. On the other hand our day-to-day forecasts have been really successful in allowing us to warn of bad weather, highlighting yet again the benefits of our research that has delivered year-on-year and decade-by-decade improvements in forecasting skill. Our 5-day forecast is now as accurate as our 1-day forecast was when I started my career. This enables us to make so many decisions that keep us safe, protect our property, keep our infrastructure running and even when to go out and enjoy the sunshine!

All of this cannot happen without improvements to research and technology, and this week the first phase of our new supercomputer went live, five weeks ahead of schedule. This will enable us to provide even more accurate and relevant weather and climate forecasts to all of us, our government, emergency responders, and our many other customers at home and abroad.

The news that the BBC has decided that the Met Office won't be their main weather provider when the current contract ends has raised the question of where will the new provider get their information from. It's important to understand that no weather forecasting organization, whether it is a National Met Service like the Met Office or an independent company, can provide a service without a forecast, and that it is the leading meteorological agencies, like the Met Office, that build and deliver those forecasts. So whoever the BBC chooses to deliver their weather services in future, you can be sure that Met Office observations and forecasts will continue to be at the heart of them. We are committed to driving forward the skill and usefulness of our forecasts and ensuring that all of us benefit from the advances

the Met Office makes in the coming years with our new supercomputer.

Date Created
August 2015